

REMARKS

Claims 1 and 4-8 are pending in this application; claim 1 being independent. In light of the amendments and remarks contained herein, Applicants respectfully request reconsideration and allowance of the outstanding claims.

Official Action

In the Office Action dated February 13, 2002, the Examiner objected to claims 1-8 under 35 U.S.C. § 112, second paragraph; noted that only three of the references cited on the Form PTO-1449 were supplied, but three other references that were listed on the Form PTO-1449 were not supplied to the Examiner; rejected claims 1-5 and 8 under 35 U.S.C. § 102(e) as being clearly anticipated by *Foster et al.* (USP 6,140,215); rejected claims 6-7 under 35 U.S.C. § 103(a) as being unpatentable over *Foster et al.*; and rejected claims 1-8 under 35 U.S.C. § 102(e) as being clearly anticipated by *Yamazaki et al.* (USP 5,932,302).

Claim Objections - 35 U.S.C. § 112

With regard to the Examiner's objection to claim 1 under 35 U.S.C. § 112, second paragraph, Applicants respectfully submits that claim 1 has been amended to delete the phrase "or the like". Based upon this amendment, Applicants request withdrawal of this objection.

With regard to the Examiner's objection to claim 3 under 35 U.S.C. § 112, second paragraph, by this Amendment, Applicants have cancelled claim 3 without prejudice or disclaimer of the subject matter contained therein, and thus respectfully request this rejection be withdrawn.

With regard to the Examiner's rejection of claim 4, Applicants have corrected the typographical errors, now properly reciting P_r. Based upon these amendments, Applicants respectfully request withdrawal of this objection.

With regard to the Examiner's objection to claim 5 under 35 U.S.C. § 112, second paragraph, Applicants have amended claim 5 to more appropriately recite the present invention. Based upon these amendments, Applicants respectfully request the objection to claim 5 be withdrawn.

Information Disclosure Statement

The Examiner asserts three (3) references cited on Form PTO-1449 were not supplied to the Examiner. Applicants note that the reference numbers provided in the Form PTO-1449 represented the pre-grant numbers of the Japanese applications. The document numbers provided by the Examiner represented the publication numbers of the same references. Thus, the three references listed by the Examiner are the same three references crossed out on the Form PTO-1449. Applicants thank the Examiner for considering these references.

Claim Rejections - 35 U.S.C. § 102(e) - *Foster et al.*

With regard to the Examiner's rejection of claims 1-5 and 8 under 35 U.S.C. § 102(e) as being clearly anticipated by *Foster et al.*, Applicants respectfully traverse these rejections.

It is respectfully submitted that in order to find anticipation of a claimed invention under 35 U.S.C. § 102, the cited reference must teach each and every claim limitation.

It is respectfully submitted that while the Examiner provides various notations within the *Foster et al.* reference, the Examiner is merely providing the teaching of ranges of frequencies and pressures.

Foster et al. teaches a method and apparatus for low temperature deposition of CVD and PECVD films. The deposition process taught by *Foster et al.* includes utilizing a gas-dispersing showerhead positioned within one inch of a rotating substrate. The showerhead is positioned a suitable distance below a gas-dispersing apparatus such that a steady state flow of gas develops between the ring and showerhead. The showerhead may be biased with RF energy such that it acts as an electrode to incite a plasma proximate with the substrate for PECVD.

Foster et al. further teaches, as the Examiner notes, that the cylinder and showerhead/electrode of the present invention is operable to deliver approximately 200-300 watts of power at RF frequencies as low as 450 KHz and as high as 13.56 MHz (col. 4, lines 53-57). Additionally, *Foster et al.* teaches the reaction or deposition space 24 within housing 22 may be selectively evacuated to various different internal pressures, for example, from 0.5 to 100 Torr (col. 5, lines 40-43).

In contrast, the present invention as set forth in claim 1 recites, *inter alia*, a plasma processing method for performing film formation, etching, or surface treatment on a substrate by supplying high frequency power between an electrode and a holder wherein pressure P (Torr) of the plasma processing gas is set to satisfy the following relationship: $2 \times 10^{-7}(\text{Torr/Hz}) \times f(\text{Hz}) \leq P(\text{Torr}) \leq 500(\text{Torr})$. It is respectfully submitted that while *Foster et al.* may teach some ranges that satisfy the relationship set forth in claim 1, *Foster et al.* fails

to teach the frequency determining the lower limit of the plasma processing gas pressure range. As such, claim 1 is not anticipated by *Foster et al.*

Claim Rejection - 35 U.S.C. § 102 - *Yamazaki et al.*

With regard to the Examiner's rejection of claims 1-8 under 35 U.S.C. § 102(e), Applicants respectfully traverse these rejections.

In support of the Examiner's rejection, numerous citations are made to the *Yamazaki et al.* reference that teach ranges.

However, as noted above, the present invention as set forth in claim 1 recites the frequency determining the lower limit of the plasma processing gas pressure range associated with the frequency. It is respectfully submitted that while *Yamazaki et al.* may provide some values of pressure and frequency that satisfy the relationship set forth in claim 1, *Yamazaki et al.* fails to teach the frequency determining the lower limit of the plasma processing gas pressure range. As such, claim 1 is not clearly anticipated by *Yamazaki et al.*

It is respectfully submitted that claims 4-8 are not anticipated by the references cited by the Examiner for the reasons set forth above based upon their dependency on claim 1.

CONCLUSION

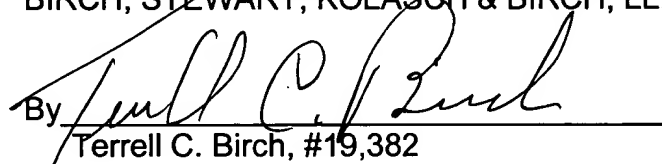
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Catherine M. Voisinnet (Provisional Reg. No. 52,327) at the telephone number below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Applicants respectfully petition for a two (2) month extension of time pursuant to 37 C.F.R. § 1.17 and 1.136(a). A check in the amount of \$400.00 in payment of the extension of time fee is attached.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
Terrell C. Birch, #19,382

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

TCB/CMV/jdm
0397-0404P

Attachment: Version With Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 2 and 3 have been cancelled without prejudice or disclaimer of the subject matter contained therein.

The claims have been amended as follows:

1. (Amended) A plasma processing method for performing film formation, etching, or surface treatment [or the like] on a substrate by supplying high frequency power between an electrode and a holder, by which the substrate is supported to be opposed to the electrode, to generate plasma between the electrode and the substrate on the basis of a plasma processing gas,

wherein the plasma processing gas is a mixture gas of a reactant gas and an inert gas, and pressure P(Torr) of the plasma processing gas is set to satisfy the following relationship

$$2 \times 10^{-7} (\text{Torr/Hz}) \times f(\text{Hz}) \leq P(\text{Torr}) \leq 500 (\text{Torr})$$

where f(Hz) is a frequency of the high frequency power.

4. (Amended) The plasma processing method according to claim 1 [2], wherein the pressure P(Torr) of the plasma processing gas is set to satisfy the following relationship

$$5 \times P_r(\text{Torr}) \leq P(\text{Torr})$$

where $[P]P_r(\text{Torr})$ is partial pressure of the reactant gas.

5. (Amended) The plasma processing method according to claim 1 [2], wherein the pressure $P(\text{Torr})$ of the plasma processing gas is set to satisfy the following relationship

$$P(\text{Torr}) \leq 3.5 \times P_L(\text{Torr})$$

where the pressure $P_L(\text{Torr})$ is a higher one of a pressure represented by [a] the following relationships

$$P_L(\text{Torr}) = 5 \times [Pr] P_r(\text{Torr})$$

[and a pressure represented by a relationship]

$$P_L(\text{Torr}) = 2 \times 10^{-7} (\text{Torr/Hz}) \times f(\text{Hz})$$

where $f(\text{Hz})$ is a frequency of the high frequency power and $Pr] P_r(\text{Torr})$ is a partial pressure of the reactant gas.

8. (Amended) The plasma processing method according to [one of] claim[s] 1 [to 7], wherein the plasma processing method is one for performing film forming processing on [a] the substrate.